NOTES FOR DESIGNER: (DO NOT INCLUDE ON CONSTRUCTION DRAWINGS)

1. REVIEW DETAILS AND EDIT AS NEEDED TO SUIT PROJECT REQUIREMENTS.

2. REFER TO THE FOLLOWING LANL STANDARDS FOR ADDITIONAL REQUIREMENTS:
   A. ENGINEERING STANDARD MANUAL MECHANICAL CHAPTER.
   B. MECHANICAL DRAWING ST-D3030-1, COOLING TOWER & CHILLER PIPING FLOW DIAGRAM.
   C. SPEC 01325, WATER DISCHARGE REQUIREMENTS.
   D. SPEC 15180, HYDRONIC PIPING.
   E. SPEC 15185, CHEMICAL WATER TREATMENT.

3. TOWER PUMP FLOW:

$$\text{GPM CIRCULATED} = \frac{\text{SYSTEM LOAD (BTUH)}}{500 \times (T\ ^\circ F\ (TWR) - T\ ^\circ F\ (TWS)}$$

4. COOLING TOWER WATER EVAPORATION:
   GPM EVAPORATED = GPM CIRCULATED X (TWR-TWS) X 0.0008

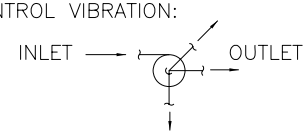
5. SEPARATOR BLOW DOWN (DRAIN):

$$\text{GPM CIRCULATED} = \frac{\text{COOLING TOWER GPM EVAPORATED}}{\text{NUMBER OF CYCLES} - 1}$$

   CYCLES = RATIO OF TOTAL DISSOLVED SOLIDS (TDS) OF TOWER WATER DIVIDED BY TDS OF MAKE-UP WATER. BASE CALCULATION ON CYCLES = 2.5

6. SYSTEM NON-POTABLE MAKE-UP WATER (NPMW):
   NPMW = GPM EVAPORATED + GPM BLOW DOWN

7. SEPARATOR: (GUIDANCE)
   A. SIZE SEPARATOR FOR 10% OF SYSTEM FLOW.
   B. MINIMUM INLET PRESSURE SHOULD BE AT LEAST 15 PSI OR EQUAL TO THE PRESSURE LOSS ANTICIPATED THROUGH THE SEPARATOR PLUS THE SYSTEM DOWNSTREAM PRESSURE REQUIREMENTS.
   C. SPECIFY A FLANGED SPOOL PIECE ON THE OUTLET OF THE SEPARATOR IN ORDER TO REMOVE THE UPPER FLANGED DOME FOR MAINTENANCE. REFER TO THE MANUFACTURER'S CATALOG DATA FOR RECOMMENDED SPOOL PIECE LENGTH.
   D. PIPE CONNECTIONS TO THE INLET AND OUTLET OF THE SEPARATOR SHOULD BE A STRAIGHT RUN OF AT LEAST 5 PIPE DIAMETERS (INCLUDING OUTLET SPOOL PIECE) TO MINIMIZE TURBULENCE. NOTE THE STRAIGHT PIPE LENGTH ON THE PIPING DRAWINGS. RECOMMENDED DIRECTION OF INLET/OUTLET PIPING TO CONTROL VIBRATION:



8. LOCATE FLOOR DRAINS CLOSE TO COOLING TOWER CONTROL SYSTEM.

9. LOCATE CONTROL CABINET AND CHEMICAL TANKS IN AN ACCESSIBLE AREA SO SYSTEM CAN BE MAINTAINED AND DRUMS REPLACED.

COOLING TOWER WATER TREATMENT SCHEDULE	
SYSTEM LOAD	TON
	BTUH
COOLING TOWER PUMP FLOW	GPM
CHILLED WATER SYSTEM FLOW	GPM
WATER TREATMENT FLOW A TO B	GPM
COOLING TOWER EVAPORATION	GPM
SEPARATOR BLOWDOWN	GPM
SYSTEM MAKE-UP WATER (NPMW)	GPM

DRAWING DEVELOPED FOR ML-3/ML-4 PROJECTS. FOR ML-1/ML-2, ADDITIONAL REQUIREMENTS AND QA REVIEWS ARE REQUIRED. (REMOVE THIS NOTE WHEN INSERTED INTO A DRAWING PACKAGE)

NO	DATE	CLASS REV	ADC	DESCRIPTION	DWN	DSGN	CHKD	SUB	APP
1	6-23-05	U	DY	GENERAL REVISION. DWG. NO. WAS ST6800.	RP	MN	RF	CD	TO

ADTS - ENGINEERING DIVISION

LANL ENGINEERING MANUAL

OPEN COOLING TOWER WATER TREATMENT NOTES AND SCHEDULE

BLDG X TA-X

DRAWN	R.PEARSON
DESIGN	R.ROMERO
CHECKED	D.NGUYEN
DATE	6-28-99

SUBMITTED PROJECT ENGINEER

APPROVED FOR RELEASE PROJECT TEAM LEADER

Los Alamos NATIONAL LABORATORY
PO Box 1663
Los Alamos, New Mexico 87545

SHEET 2
2 OF 2

CLASSIFICATION: U
REVIEWER: LARRY BAYS
DATE:

PROJECT ID	DRAWING NO	REV
CHAPTER 6	ST-D30GEN-1	1